Cal/Ecotox
Exposure Factors for Red-legged Frog (Rana aurora)*

Endpoint Type	Endpoint Value	Error	Range	Units	Sex	Life Stage	Location	Note	Reference
Age at Fledging, Metamorphosis, Weaning	see citation				NR	Hatchling	OR	a	1
Age at Fledging, Metamorphosis, Weaning			3-5	mo	B	Tadpole	CA	b	2
Age at Sexual Maturity	2			yr	B	Adult	OR	c	3
Age at Sexual Maturity			2-4	yrs	B	Adult	CA	d	2
Body Weight - Mean	see citation				NR	Hatchling	OR	e	1
Body Weight - Mean	log W = -4.60 + 3.085(log L)			mg	NR	Tadpole	CANADA	f	4
Body Weight - Mean	6.46			g	NR	Tadpole	WA	g	5
Clutch or Litter Size	531	19 SE		#/egg mass	F	Adult	CANADA	h	4
Clutch or Litter Size	680		194 - 921	# ova/egg mass	F	Adult	CANADA	i	6
Clutch or Litter Size			541 - 1081	#/egg mass	F	Adult	OR	j	3
Clutch or Litter Size	600			#/ egg mass	F	Adult	WA	k	5
Dietary Composition	see citation				B	Both Adult and Juv.	CANADA	l	7
Dietary Composition	see citation				NR	NR	Los Angeles; San Bernardino; Santa Barbara; CA	m	8
Duration of Incubation or Gestation	35			d	B	Embryo	WA	n	5
Duration of Incubation or Gestation			6 - 7	wks	NR	Embryo	OR	o	3
Growth Rate	0.62			mm/d	NR	Tadpole	WA	p	5
Growth Rate	0.99			mm/d	NR	Tadpole	WA	q	5
Longevity			12 - 15	yrs	F	Adult	Lab	r	9
Metabolic Rate	0.59	0.10 SD	0.51 - 0.77	cm3 O2/egg/hr	NR	Embryo	Lab	s	10
Population Density	500			#/m2	NR	Tadpole	CANADA	t	4
Survival/ Mortality	68.6			%	NR	Adult	CANADA	u	6
Survival/ Mortality	18.0			%	NR	Both Adult and Juv.	CANADA	v	6
Survival/ Mortality			91 - 92	%	NR	Embryo; Juvenile	CANADA	w	6
Survival/ Mortality	5			%	NR	Tadpole	CANADA	x	4
Survival/ Mortality	5.3			%	NR	Tadpole	CANADA	y	6
Survival/ Mortality	<1			%	NR	Tadpole	CANADA	z	6
Time of Fledging or Metamorphosis	July - Sept.				B	Tadpole	CA	aa	2
Time of Fledging or Metamorphosis	July - Oct.				NR	Tadpole	CANADA	ab	4
Time of Fledging or Metamorphosis	June - July				NR	Tadpole	OR	ac	3
Time of Fledging or Metamorphosis	July				NR	Tadpole	WA	ad	5
Time of Hatching or Parturition	Apr.				B	Embryo	WA	ae	5
Time of Hatching or Parturition	May				NR	Embryo	CANADA	af	4
Time of Mating/ Laying	Feb. - Mar.				B	Adult	WA	ag	5
Time of Mating/ Laying	Feb. - Apr.				B	Adult	CANADA	ah	11
Time of Mating/ Laying	review				B	Adult		ai	12
Time of Mating/ Laying	Feb. - Apr.				F	Adult	CANADA	aj	4
Time of Mating/ Laying	Jan. - Feb.				F	Adult	OR	ak	3

Notes

a figure of mean time to metamorphosis with and without bullfrog presence; N=100-150; Age=Gosner stage 25 larvae; January; field enclosures at E.E. Wilson Wildlife Refuge, Benton County

b	N=NR
c	N=NR; Corvallis; males are over 50 mm and females near 60 mm snout-vent length at this age
d	N=NR
e	figure of mean mass of larvae with and without bullfrog presence; N=100-150; Age=Gosner stage 25 larvae; January; field enclosures at E.E. Wilson Wildlife Refuge, Benton County
f	regression equation relating body weight (W; mg, dry wt.) to body length (L; mm); N=NR; Marion Lake, southern British Columbia (elev., 300m); see citation for figure of relationship
g	average maximum weight (75.9 mm total length); N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m); see citation for figure of seasonal changes in tadpole body weight
h	N=35 egg masses; Marion Lake, southern British Columbia (elev., 300m)
i	N=NR; White Rock, British Columbia; see citation for figure of relationship between fecundity and snout-vent length
j	N=6 egg masses; Corvallis
k	N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
l	frequency of occurrence and food item abundance of 53 items (family level and prey lifestage) in stomach contents; N=26-104/lifestage; May-Oct.; White Rock, British Columbia [lat., 49^o02'N; long., 122^o39'W]
m	occurrence of 48 items (species) in digestive tracts; N=31 frogs; Canada de la Gaviota and collections at California State Polytechnic University
n	time from egg to hatching, water temperature ranged from 4.5 - 7.8C; N=35 egg masses; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
o	time from egg to hatching under field conditions; N=NR; Corvallis
p	average growth rate (total length) from stages 23-30; N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
q	average growth rate (total length) from stages 30-39; N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
r	N=2
s	oxygen consumption at 18.5C; N=6 replicates with 30 embryos each; Age=stage 12 - 15
t	maximum reported density; N=NR; Marion Lake, southern British Columbia (elev., 300m)
u	annual minimal survival; N=67; White Rock, British Columbia
v	annual minimal survival; N=256; White Rock, British Columbia
w	embryo survival, estimated by counting # dead embryos in 100 eggs/egg mass; N=22 egg masses; Age=stage 13; White Rock, British Columbia
x	survival of larval population until metamorphosis; N=NR; Apr. - Aug.; Marion Lake, southern British Columbia (elev., 300m); see citation for seasonal changes in tadpole population size and effect of predation and density on survival in enclosures
y	survival from tadpole to young-of-the-year frogs; N=NR; White Rock, British Columbia; see citation for survival curves from egg through 1 yr postmetamorphosis
z	survival from hatching to metamorphosis; N=9,901-12,512 hatching embryos; White Rock, British Columbia; see citation for seasonal changes in tadpole population size
aa	N=NR
ab	N=NR; Marion Lake, southern British Columbia (elev., 300m); estimated by appearance of forelimbs
ac	N=NR; Corvallis
ad	N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
ae	N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
af	N=observations over 3 yrs; Marion Lake, southern British Columbia (elev., 300m)
ag	determined by presence of calling males and new egg masses; N=NR; Lake Louise Wildlife Sanctuary, Bellingham, Whatcom county (elev., 120m)
ah	time of breeding and laying; N=NR; White Rock, British Columbia
ai	N=NR
aj	time of first observance of egg masses; N=observations over 3 yrs; Marion Lake, southern British Columbia (elev., 300m)
ak	time of egg laying; N=NR; Corvallis

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